



The websites adoption in the Spanish agrifood firms

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Abstract

Currently, the use of websites in the firms of the Spanish agrifood sector has not become widespread despite the possible benefits to be derived from their adequate integration and management within the firms. Among these advantages, the increase in the quality of the services offered and the improvement in the relations with their stakeholders should be highlighted. In this context, the objective of the present work is to determine to what extent websites are used by firms in the agrifood sector of Spain, analysing the background which explains why they are adopted and the consequences of introducing them. To do so, a theoretical framework is posed which allows these factors to be identified, and an empirical study is carried out with Spanish agrifood firms. The results of the work indicate that the adoption of websites will be favoured when the directors of the firm are higher qualified, the firm is bigger in size, the firm's function is distribution, and when the relative advantage and technology compatibility is perceived, among others. Technology adoption consequences analysis suggests that the benefits of adoption are related with improving the relationships with suppliers, customers, owning partners and, in general, the quality of the services offered by the firm.

Additional key words: innovation; ICT; internet; Spain.

Abbreviations used: ICT (Information and Communications Technologies); IDT (Innovation Diffusion Theory); MM (Motivational Model); TAM (Technology Acceptance Model); TRA (Theory of Reasoned Action); Web (World Wide Web).

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Introduction

In a society such as today's, where constant changes occur, knowledge and innovation have become the principal motors driving the economy (Luengo & Obeso, 2012). In this context, few topics have received as much attention as the Internet, specifically its main communication platform, the World Wide Web (Web), which is considered to be a strategic technology which has found application in practically all sectors of the economy (Mishra & Williams, 2006).

The Web has become one of the most important means of sharing information from business to business and from business to consumer (Beatty *et al.*, 2001), and also, at the level of purchase-to-pay networks, as in the case of issuance of purchase orders or elec-

tronic invoicing. In addition, other relationships have been strengthened, such as business to administration, business to employee and business to investors (CEA, 2015). Therefore, firms are now able to share information and process transactions with their customers, organizations and individuals, due to automation of the supply chain, without the need for a face-to-face business relationship. Its evolution is described as a change in corporate culture and involves attributes or characteristics such as speed, collaboration, transparency, and interconnectivity (Mozas & Bernal, 2012). This leads to changes in traditional decision-making processes and the forming of commercial strategies to obtain operational and administrative benefits that improve the firm's overall competitive position and the relations with their stakeholders, according to their correspond-

ing position in the value chain (Beatty *et al.*, 2001). Consequently, all these benefits can be obtained by the adoption of a corporative website, depending on the goals sought by the firm (Balogun, 2013).

In this context, different authors (Benito, 2009; Mozas & Bernal, 2012; Bhaskaran, 2013) have shown the importance of using websites to the extent that, together with other information and communications technologies (ICT), they have driven an increase in productivity in these firms. This is fundamentally due to the possibility of managing large amounts of information easily and simply, which has supposed a major push to be nearer to the customers, to penetrate into new markets and to reduce costs. Other important benefits include the ability to facilitate the diffusion of information and organisational knowledge to stakeholders and to offer quality customer services.

In Spain, 98.3% of firms had access to the Web (ONTSI, 2015). However, the online presence through a corporate website reached 78.8% of the firms and this varied depending on their size and business sector. Thus, in 2013, 89% of large firms had a website, while in medium-sized firms the penetration percentage decreased to 87.8%, and the adoption rate for small firms was only 68.8%. At sectorial level, the industrial, wholesale and retail trade sectors, which include agrifood firms, have a mean level of use of around 68%.

Despite the advantages afforded by a corporative website to firms, its use has not become widely adopted (ONTSI, 2015). In the case of the Spanish agrifood sector firms, of great economic and social importance for the country, contributing with 8.4% to the Spanish total value added, and generating more than 2.3 million jobs and a net sales volume of more than M€ 93,200, which represents more than 22% of the industrial GDP and around 2.7% of the national GDP (MAGRAMA, 2015), the different levels of introduction of websites respond to, among other aspects, the dependence on the characteristics of the managers. These firms are usually somewhat centralised, and have difficulties to find qualified personnel with user level ICT knowledge and skills (Meroño & Arcas, 2006). Anyway, the Spanish agrifood firms cannot and must not be left behind. Identifying the repercussion that the use of websites can have is necessary when considering new business models and facilitating the relationships between the different stakeholders of these firms (Mozas & Bernal, 2012; Granollers *et al.*, 2013).

In this context, the objective of this work was to determine the degree of website use in Spanish agrifood firms, additionally analysing the background which explains website adoption and the consequences of their introduction.

Material and methods

Theoretical framework

Defining the factors that condition the adoption of a technological innovation has become a critical aspect for researchers who have sought to explain the adoption process (Al-Somali *et al.*, 2009). This situation has meant that different theories and models have been proposed which help to explain the process of adopting an innovation. Thus, the Theory of Reasoned Action (TRA) states that the attitudes, intention and beliefs of a person are instrumental in carrying out an action (Ajzen & Fishbein, 1975). The Motivational Model (MM) was developed to provide an explanation to the motivations which influence in the intentions of individuals when developing an activity or taking a decision (Deci & Ryan, 1985). The Technology Acceptance Model (TAM) complements the TRA, arguing that the perceptions on the ease of use and the usefulness are the variables which affect the attitude and intentions of an individual to adopt a technology (Davis *et al.*, 1989). Finally, Rogers' Innovation Diffusion Theory (IDT), the most general of them all, defines the adoption as a process in which an innovation is communicated through certain communication channels over time and among the members of a social system (Rogers, 2003). This theory gathers and formalises some of the principal theories and has become one of the most frequently used when studying the adoption of innovations. The IDT identifies five attributes that exert an influence on the adoption of an innovation and allows to measure the perceptions the adopters have on the technology, grouping them into: 1) the *relative advantage* over the other existing alternatives, which varies depending on the users' knowledge and their particular skills in using the technology; 2) the *complexity*, understood as being the degree of difficulty that is perceived in using the technology, since it may require learning both at individual as well as organisational level; 3) the *compatibility*, or degree to which an innovation is perceived as being consistent with the cultural values, previous experience, needs and resources of the adopters; 4) the *possibility to test*, since with real examples the advantages of the technology are easier to appreciate; and 5) the *observability*, that is to say, the degree to which the results of the innovation can be observed by the rest of the potential adopters.

The IDT assumes that the individuals adopt at different times, since their perceptions regarding the general attributes of an innovation differ. This is due, in most cases, to the fact that adoption occurs when the perception of the benefits of the innovation has been

legitimised as it has been adopted by the majority of a social system's members. In this context, the individuals who adopt later than the innovator group may only be doing so in order to not fall behind their competitors, even if they have yet to perceive the benefits of adoption. For this reason, innovations often bring unwanted consequences, or their effects are not as expected (Beatty *et al.*, 2001; Rogers, 2003; Lee *et al.*, 2010).

In the literature regarding innovation adoption, the technology attributes of *relative advantage*, *compatibility*, and *complexity* have proven to be the ones which exert the greatest influence on adopting a technology, whilst attributes such as the possibility to test it and the observability have not been studied to the same extent (Beatty *et al.*, 2001). Similarly, in the majority of studies related to innovation adoption, as well as considering the characteristics defined in IDT as factors which condition adoption.

Other personal or firm characteristics are considered with the intention of studying in detail the magnitude of the factors determining the decision to adopt. Regarding the personal characteristics, some authors have included variables in their adoption models such as the academic level (Gloy & Akridge, 2000), since education represents a greater capacity for learning to use new technologies. Also, their experience in using the Internet has also been considered as a starting point for adopting more complex ICT (Putler & Zilberman, 1988; Lewis, 1998; Gloy & Akridge, 2000).

Among the characteristics of the firms that affect the decisions to adopt ICT, the most frequently used is the firm's size (Thong & Yap, 1995; Balogun, 2013), measured in terms of the number of employees or the turnover. It is argued that large firms face more complicated decisions when carrying out their operations productively and efficiently, and therefore are more at the forefront in adopting innovations which allow the profitability to increase (Hollenstein, 2004; Mishra &

Williams, 2006; Plana *et al.*, 2006) but other works have not found that size plays a role in the ICT adoption (Hollenstein, 2004; Estapé-Dubreuil & Torreguitart-Mirada, 2014). The *business sector* has been included, considering that the particularities of each sector can influence in the decision making in a firm (Mcfarlane *et al.*, 2003; Henderson *et al.*, 2005; Baer & Brown, 2006; Mishra & Williams, 2006; Vilaseca *et al.*, 2007a; Corrocher, 2011). Similarly, the firm's function in the supply chain can influence the adoption decision into one specific sector (Henderson *et al.*, 2005). There are also others variables, such as the age of the firm (Thong & Yap, 1995; Balogun, 2013) or the legal status of the organization that are employed in the adoption models, *e.g.* in Spain, the social economy firms have a good ICT positioning in the business framework (Estapé-Dubreuil & Torreguitart-Mirada, 2014). In addition, it is believed that it could be a relationship between ICT adoption and the firm's strategic objectives (Beatty *et al.*, 2001; Bhaskaran, 2013). In this context, the theoretical framework employed in the present paper combines the TAM with the IDT model. This framework allows us to investigate the main technological perceptions, relative advantage, compatibility and complexity, in explaining the adoption decisions (Corrocher, 2011), together with the personal and firm characteristics. The conceptual framework of the adoption process is shown in Figure 1.

Data collection

The study population used in this work is composed of the 26,203 agrifood firms in Spain in 2009, of which some 88% had e-mail (ONTSI, 2010). From the information offered by different firms dedicated at launching marketing campaigns, and of the business directories of different agrarian associations in Spain, a work

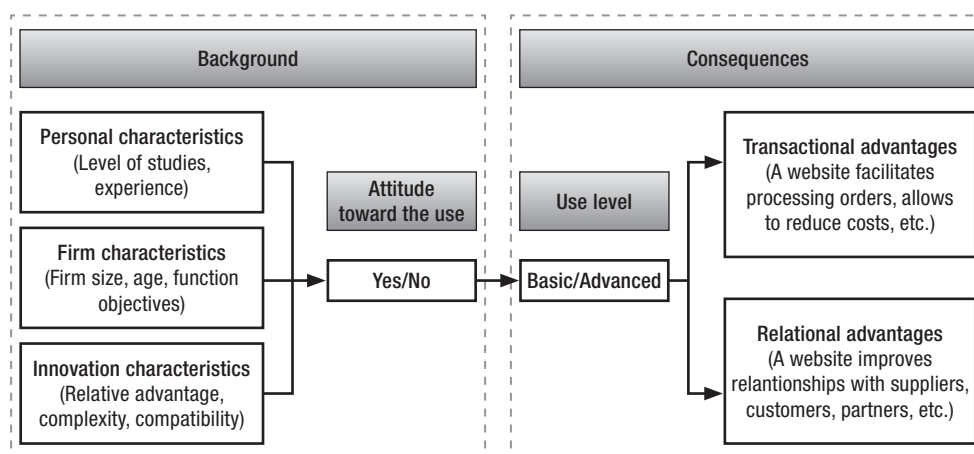


Figure 1. Theoretical framework.

universe of 6,000 firms with contact details was identified.

For information gathering, an online survey was used in the form of a questionnaire sent by e-mail to the managers of the firms between January and March 2009. The process consisted of first sending the questionnaire to all the firms within the work universe. Subsequently it was sent on two further occasions as reminders.

The questionnaire was structured into three principal blocks which covered items related to: 1) general information, on the profile of the respondent and economic aspects of the firm; 2) information to evaluate the degree of importance that the respondent gives to achieving certain strategic objectives for his/her firm; and 3) information relating to the perception of the innovation's attributes "before and after" its adoption.

When the data collection process had finished a total of 119 properly completed questionnaires had been received, which means that for a 95% confidence level, the sample error is less than 9% for the most unfavourable case of intermediate proportions (Table 1). However, accuracy of sample also depends on the percentage of the sample that took the adoption decision. In this specific case, considering that the proportion of website adopters is 78%, the level of accuracy increases and the confidence interval sample error is reduced to 7%.

Empirical analysis

The analysis of the factors influencing the decision to adopt a website was carried out using Logit¹ models. These models allow the endogenous variable Y_i , bounded between 0 and 1, to be related with a series of explicative variables X_{ki} through a logistic distribution function. The goal of logit models is to find the relationship between the endogenous variable and a set of independent variables. This model generates the coefficients of a formula to predict a logit transformation of the probability of the characteristic of interest being present:

Table 1. Datasheet.

Characteristic	Description
Work universe	6,000 agrifood firms
Geographical scope	National, Spain
Collecting information	Online survey
Sample size	119 agrifood firms
Date of work	April to June 2009

¹ For more on Logit, see Cramer (2003)

$$\text{logit}(p) = \beta_k X_k + \varepsilon_i \quad [1]$$

where p is the probability of presence of the characteristic of interest and β_k is a vector of regression coefficients. The logit transformation can be defined as:

$$\text{odds} = \frac{p}{1-p} \quad [2]$$

where p is the probability of presence of the characteristic and $1-p$ is the probability of absence of the characteristic. Therefore,

$$\text{logit}(p) = \ln \frac{p}{1-p} \quad [3]$$

The estimation in logit models chooses parameters that maximize the likelihood of observing the sample values. Thus, the regression coefficients can be interpreted as in linear models, where B_k represents the change in the logit of the probability associated with a unit change in the k -th predictor holding all other predictors constant.

When attempting to model a dichotomous endogenous variable the possibility to use the Probit models also exists. However, both methods will yield similar inferences (Cramer, 2003).

Namely, the adoption of websites would be specified as:

$$Y_i = f(M, F, T) \quad [4]$$

where Y_i = use or not use of a website; M = vector of variables that describe the characteristics of the managers; F = vector of variables that describe the characteristics of the firm; and T = vector of variables that describe the characteristics of the technology.

Dependent variable

To define the dependent variable, the respondents were asked if their firm had or did not have a website. This information was converted into a dummy variable which gives the firms the value of 0 if the firm does not have a website and 1 to those which use websites.

Independent variables

The independent variables were defined in accordance with a series of personal characteristics of the managers and of the firm; to firm characteristics, including the importance that the respondents gave to achieving certain

strategic objectives; and to the degree of agreement with some statements drafted in the form of barriers, associated with the characteristics of the technology. Table 2 details how these variables were measured and provides descriptive statistics. Additionally, the expected effect that, according to the literature, the variable has on the probability of adopting website use is shown. Thus, having greater experience in using the Internet and having a higher academic level are expected to positively influence the disposition to adopting a website.

The answers regarding opinions and perceptions about the technology employed a multi-item scale from 0 to 10, where no importance or total disagreement was codified with a value of 0, while great importance or total agreement was codified with a value of 10. In this sense, total agreement with the statements associated to achieving business objectives (*INSALES*, *INPUTS*, *MARKET*, *RCOSTS*, *DIFFCOMP*) should indicate a higher probability to adopt a website. Likewise, major disagreement with the statements drafted in the form

Table 2. Definition of dependent and independent variables.

Variable	Description	Mean / %respondents	SE	Min.	Max.	Expected effect
Dependent						
WEBSITE	Website adopters	78%				
Independent						
Manager (M)						
LEVELST	Level of education					+
	Primary =1	4%				
	Secondary education =2	9%				
	High school =3	27%				
	University studies =4	46%				
	Postgraduate studies =5	14%				
EXPEUSE	Experience in the use of Internet (years)	10	3.52	2	20	+
Firm (F)						
FIRMAGE	Age of firm (years)	35	6	6	79	+
Firm size						
SSIZE	Small firms (turnover ≤10 million euros)	36%				-
MSIZE	Medium-sized firms (>10 to 50 million euros)	46%				+
LSIZE	Large firms (turnover >50 million euros)	18%				+
Firm function						
PRODUCT	Production	14%				-
MANUFACT	Manufacture	18%				-
DISTRIBUT	Distribution	47%				+
SERVICES	Services	21%				+
Legal status						
COOP	Cooperatives firms	44%				+
OTHERLS	Other legal forms	56%				-
Firm objectives importance (0 = no importance; 10 = great importance)						
INSALES	Increase sales	8.57	0.13	8.30	8.83	+
INPUTS	Get inputs with the best relationship quality-price	8.33	0.14	8.05	8.62	+
MARKET	Use new marketing channels	7.53	0.16	7.21	7.83	+
RCOSTS	Reduce costs	8.25	0.16	7.93	8.57	+
DIFFCOMP	Differentiating from the competitors	8.48	0.14	8.22	8.76	+
Technology (T)						
Technology perceptions (0 = total disagreement; 10 = total agreement)						
COMPLEX	A website is a very complex innovation	7.18	0.24	6.71	7.65	-
BENEFITS	The relation cost benefit of a website is not clear	6.29	0.21	5.87	6.71	-
CHARACT	It is not possible to differentiate the characteristics and attributes of products offered in a website	6.53	0.22	6.09	6.96	-
SECURITY	There is no security in transactions on a website	6.78	0.19	6.39	7.16	-
DIFFERENT	The use of a website is not compatible with the competitive strategy of my firm	6.74	0.22	6.29	7.19	-
HELP	The use of a website is not compatible with the activity of my firm	7.36	0.24	6.88	7.85	-

of barriers associated to adopting should lead to a greater disposition to adopting a website. In this case, the statements were reduced by means of factor analysis prior to their inclusion in the adoption model, with the intention of mitigating the multicollinearity impact and showing how technology characteristics, relative advantage, compatibility, and complexity, are consistently related to innovation adoption.

Results and discussion

Background of adopting a website

The number of items used to measure the technology barriers to adopting this technology has been reduced using a factor analysis (Table 3). The results of the Bartlett's sphericity test ($\text{sig} = 0.000$) and the KMO test (0.730) determined that it was adequate to apply factor analysis to the group of seven variables. After analysing the matrix of rotated components, three factors were obtained in accordance with the website: relative advantage, complexity, and compatibility.

Factor 1, denominated "*RELATIVE ADVANTAGE*", is related with the items used to measure the cost-benefit relationship of a website, the product attribute differentiation offered in a website, and the existence of transaction security in a website. Factor 2, denominated "*COMPLEXITY*", is related with the statements that a website is a very complex innovation. In factor 3, denominated "*COMPATIBILITY*", the items that saturated were related with the difficulty in differentiating from the competitors and the consideration that a website is a tool not compatible with the firm activity. Obtaining factors facilitated the inclusion of the main technology characteristics in the adoption model.

Seventy-eight percent of the firms were considered as website users. Table 4 shows two models, obtained by the backward stepwise elimination method, to ana-

lyse the effect of the independent variables on website adoption, a general model which included all the variables that can affect the decision to adopt (model 1) and a restrictive model which included only the variables which were significantly different from zero (model 2). The results obtained with the restrictive model confirmed the statistical significance of the variables included in the model and the Log-Likelihood Ratio Test fails since it rejects the combined hypothesis ($\text{LR} = 6.15 < X^2_{0.05,9} = 16.92$), thus confirming that the restrictive model is the one with the best fit.

Analysis of the results for the adoption model confirms the expected effect of the variable *LEVELST* towards adoption. This variable establishes a direct relationship between the academic level of adopters and the adoption of websites by agrifood firms. That is to say, a higher level of education means that less complexity is perceived in using websites and a greater number of innovative ideas are generated related to their use, positively affecting adoption (Bettman & Park, 1980).

With regard to the firm characteristics, the positive coefficient for the variables *SIZE2* and *SIZE3* indicates that the firms possessing a greater size, in term of turnover, tend to increase the global profitability of adoption and with it, the probability of adoption. Generally, large firms have been more innovative, due to the fact they can face more complicated decisions when carrying out their operations productively and efficiently, as well as having the capital necessary for its acquisition (Estapé-Dubreuil & Torreguitart-Mirada, 2014). Additionally, the implementation of an Internet strategy requires some technical computer skills that may not be present in small companies (Henderson *et al.*, 2005).

The firm function included in the model that contributes to explaining the adoption relates to those firms dedicated to distributing agrifood goods (*DISTRIBUT*). This type of firm tends to increase the probability of

Table 3. Factors associated with the characteristics of innovation.

Variable	Relative advantage	Complexity	Compatibility
COMPLEX	0.116	0.840	0.174
BENEFITS	0.757	0.223	0.223
CHARACT	0.703	0.447	0.110
SECURITY	0.692	-0.387	0.198
DIFFERENT	0.168	-0.026	0.872
HELP	0.289	0.089	0.779
% of total variance explained	68.45		
KMO Measure of sampling adequacy	0.73		
Approx. chi-square	165.92		
df.	21		
Sig.	0.000		

Table 4. Adoption models.

Variable	Model-1		Model-2	
	Coef.	SE	Coef.	SE
LEVELST	2.40 ***	(0.75)	1.96 ***	(0.64)
EXPEUSE	0.28	(0.13)		
FIRMAGE	-0.04	(0.28)		
MSIZE	2.24 **	(1.13)	2.03 **	(0.89)
LSIZE	3.15 *	(1.85)	3.20 *	(1.81)
MANUFACT	-0.05	(1.59)		
DISTRIBUT	3.41 **	(1.53)	2.50 ***	(0.83)
SERVICES	0.97	(1.72)		
COOP	0.32	(0.85)		
INSALES	-0.26	(0.40)		
INPUTS	0.20	(0.47)		
MARKET	-0.51	(0.32)		
RCOSTS	-1.34 ***	(0.51)	-1.52 ***	(0.41)
DIFFCOMP	1.10 ***	(0.42)	-0.80 ***	(0.30)
RELATIVE ADVANTAGE	-1.65 **	(0.78)	-2.56 *	(0.54)
COMPATIBILITY	-1.00 *	(0.56)	-0.84 *	(0.50)
COMPLEXITY	-0.02	(0.90)		
CONSTANT	-1.24	(3.62)	-0.75	(2.85)
Observations	119		119	
Log likelihood	-27.04		-30.11	
LR χ^2	70.86		64.71	
Pseudo R^2	0.57		0.52	
Percentage of correct classification	88.2		89.9	

Level of significance: *** $p < 0.01$; ** $p < 0.05$ * $p < 0.10$.

adopting websites regarding the production, manufacturing and agricultural services firms (*PRODUCT*, *MANUFACT*, *SERVICES*), among which no significant differences were found. This could be explained by the fact that distributions firms are closer to the final consumer, the potential number of users is greater, and it also helps them to generate a certain volume of business (Vilaseca *et al.*, 2007b). Previous works (Goode & Stevens, 2000) had found that the firm function in which a business operates has a great influence on its members' information processing requirements and that affects the adoption of technology of business (Balogun, 2013).

On the other hand, the unclear relationship between firm objectives and their effect over the adoption is confirmed in the model. Most of the objectives have not proven to be significant towards adoption, despite the consideration that Internet presence and the advances experienced by it recently can provide a source of competitive advantage for agrifood firms (Meroño & Arcas, 2006; Mozas & Bernal, 2012). However, the positive and significant sign of the variable *DIFFCOMP* suggests that the firms seeking to be differentiated from the competitors tend to adopt earlier. Penttinen & Palmer (2007) showed that ICT adoption enables more extensive offerings and, therefore, the firms use the ICT to pursue a differentiation strategy

through services. Conversely, those firms that gave higher importance to reducing cost (*RCOSTS*) tend to delay the adoption because they perceive a high cost involved in the adoption.

With regard to the expected effects, the barriers included in the model confirm our expectations through the factors *RELATIVE ADVANTAGE*, *COMPATIBILITY* and *COMPLEXITY*. In particular, relative advantage and compatibility display a negative and significant coefficient, meaning that an increase in these variables is associated with a lower probability of adoption. Thus, those firms perceiving that these barriers to adoption were more important tend to adopt later.

In the present study, complexity did not show any significant effect over the adoption probability. This result is in line with Corrocher (2011) for the compatibility factor. However, she found a negative relationship between complexity and Social networking while for the relative advantage factor no significant relationship was found. This fact suggests that each specific ICT has a specific perception that should be individually analysed.

The variable which measures the experience in the use of the Internet (*EXPEUSE*) has not proved to be significant towards adoption, in spite of resulting explicative in the adoption model of other ICT such as

Table 5. Reduction advantages.

Factor (Var. Exp.)	Description	Mean	SE	Min.	Max.	Factorial weight
Transactional Factor 1 (64%)	A website facilitates processing orders	4.16	2.38	1	10	0.817
	A website allows the firm to reduce costs	4.73	2.18	1	10	0.843
	A website is a reliable trading channel	4.05	2.35	1	10	0.918
	A website allows turnover to be increased	4.23	2.47	1	10	0.509
	A website allows the firm to differentiate from its competitors	4.59	2.58	1	10	0.641
Relational Factor 2 (13%)	A website improves the relationships with suppliers	4.87	2.26	1	10	0.660
	A website improves the relationships with customers	4.40	2.28	1	10	0.638
	A website improves the relationships with owning partners	5.31	2.57	1	10	0.933
	A website improves the quality of the services offered by the firm	4.65	2.71	1	10	0.609

Table 6. Test for comparison of means.

Factor	Category	Mean	Bilateral sig.
<i>Means related</i>			
F ₁ Transactional	Total users	4.35	0.005
F ₂ Relational	Total users	4.80	
<i>Independent samples</i>			
F ₁ Transactional	Basic users	4.22	0.292
	Advanced users	4.87	
F ₂ Relational	Basic users	4.02	0.025
	Advanced users	5.43	

electronic billing (Hernández-Ortega & Serrano-Cinca, 2009). Therefore, although it was expected that the firms with the widest experience in Internet use would show a more positive attitude towards adoption since it would enable them to be in contact with their stakeholders, principally suppliers and customers (Hernández-Ortega & Serrano-Cinca, 2009), for the case of agrifood firms no significant effect is appreciated for this variable. Likewise, the variable which measures the age of the firm (*FIRMAGE*) has not proved to be significant. However, other studies that considered it have found significant differences regarding adoption, stating that the firms with a website are consolidated and are over 20 years old (Meroño & Arcas, 2006). Also, the legal status showed a non-significant effect over the website adoption.

Consequences of adopting a website

Although they have websites, the agrifood firms may choose to use them in different ways. Therefore, the sample of those who adopted websites were asked their perception regarding a series of advantages regarding their use of this technology. The variables were measured on a multi-item scale from 1 to 10, where complete disagreement was codified with a value of 0, whilst total agreement was given a value of 10. The scales were grouped into categories by means of factor

analysis (Table 5). After analysing the matrix of rotated components, two factors were identified which explained 77% of the variance in the data. The results of the Bartlett's sphericity test (sig = 0.000) and the Kaiser-Meyer-Olkin test (0.939) confirm that it was adequate to apply factor analysis.

Among the variables that saturated in Factor 1, denominated *TRANSACTIONAL*, are those related to the perception that a website facilitates processing orders, allows turnover to be increased, is a reliable trading channel, allows the firm to reduce costs, and differentiates it from its competitors.

Furthermore, the variables that saturated in Factor 2, denominated *RELATIONAL*, are the perceptions that a website improves the relationships with suppliers, customers, owning partners and, in general, the quality of the services offered by the firm.

With the intention of determining if the difference in observed means between the transactional and relational factor was significant, a *T-test* was carried out for related samples (*total users*) comparing both factors. The critical level of bilateral significance of the test enabled the equality of means hypothesis to be rejected and to conclude that the values given to both factors differ significantly, and to observe that the perception of relational use of a website is better valued than the transactional use (Table 6).

To delve deeper into the differences of both factors, a comparative analysis was carried out of perceptions of website use according to the real use made of the website. To determine the real use, the firms which used at least one transactional tool, such as online ordering with traditional forms, the virtual shop with a shopping trolley and electronic payment, or a relational use such as Intranet/extranet and a register of customers on the website, were considered "advanced" users (30%), whilst the remainder (70%) were considered basic users. This information was used to carry out a T-test of means comparisons for independent samples. The results confirmed that the advanced users value more those aspects which measure the intention to improve relations with stakeholders and the quality

of the services offered. Therefore, they use web tools principally with a relational focus.

The principal contribution of this research is its integrative approach. On the one hand it contributes to increase the scientific knowledge and literature related to determinant factors of adopting ICT technology. On the other hand, the importance of use ICT is highlighted, namely websites, identifying their level of use and analysing the adoption consequences. Therefore, the main conclusions obtained from the study are as follows.

First, it is confirmed that personal characteristics such as the education level of the managers positively affect the adoption of a website. Among other reasons, this is because a high academic level makes them perceive less complexity and greater relative advantages to be attained from the use of the innovation.

Second, the firm's characteristics, such as size, being dedicated to distributing agrifood goods, or the importance given to being differentiated by competitors, positively affect website adoption. Conversely, when the objective of a firm in relation to reducing costs increases, so the probably of adoption decreases.

Third, and depending on the technology characteristics, the relative advantage and compatibility are seen as factors that positively affect website adoption. In this context, it becomes necessary for the firms to consider exploiting the service in a more advanced manner, working on the introduction of new tools which enable them to achieve their targets, and in the improvement of relationships with their stakeholders. These include the introduction of private areas, the use of social networks to promote products, or activities related with the firm or e-business.

Fourth, the results show that, unlike with adoption, where transactional aspects, such as reducing costs and differentiating from its competitors received importance, the perception of relational use of a website is better valued than the transactional use. Likewise, it is not surprising that advanced users value both transactional and relational aspects associated to the use of a website more than basic users. It is possible that these firms try to provide themselves with a sense of balance focused on increasing competitiveness.

Despite the agribusiness sector being a dynamic sector that must have the ability to continuously innovate to be competitive, the current website adoption rate shows a similar value to those in the date of data collection, indicating that the adoption process is becoming established although there is still room for improvement.

Consequently, a number of recommendations can be extracted from the results aimed at making the agrifood firms increase their adoption and the degree of use

given to the website, amongst which are: a) to increase the degree of training of the personnel regarding the use of web tools and adapting the design of the website (presentation and administration of contents, etc.), according to the characteristics and needs of the firms and their users, so as to reduce the complexity they perceive; b) to add value to the website through the use of new web tools which help the flow of information and knowledge of the firm, thus increasing the interest and satisfaction of those who access the site; c) to spread the advantages, both relational and transactional, of website use; and d) to facilitate firms access to websites by means of reductions in the introduction and maintenance costs, and by improving financial facilities.

Finally, there are some research limitations that could be considered as future research lines. A bigger sample would allow a deeper and more detailed analysis at business subsector level, among others. Also, other topics are worthy of study, it could be interesting to consider a further analysis over particularities of Spanish agrifood firms such as legal form, level of integration, etc., in the adoption and use of other ICTs.

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